Abstract of the Disclosure

The present invention relates to a signal processing method and system for correcting organ motion artifacts for cardiac and brain imaging. A plurality of sets of MRI measurement data indicative of at least an image of an object is received. Each set corresponds to one row k_x of a k-space matrix of at least a k-space matrix. For each set a k-space matrix of the at least a k-space matrix is determined for allocation thereto based on motion information of the object occurring during acquisition of the plurality of sets of the MRI measurement data. In a following step a location within the allocated k-space matrix corresponding to a row of the k-space matrix allocated thereto is determined for each set. At least a k-space matrix is then generated by re-arranging the plurality of sets. Each of the at least a k-space matrix comprises the sets of the plurality of sets of the MRI measurement data allocated thereto. Inverse Fourier transforming of the plurality of k-space matrices provides at least a reconstructed image. Through careful selection of the phases of the cardiac and respiratory cycles and corresponding ranges MRI data acquisition periods are of the order of seconds or a few minutes. Furthermore, integration of motion artifact free MRI images of different phases of organ motion using the coherent k-space synthesis according to the invention allows provision of an animation showing different phases of a cardiac or lung cycle. In an embodiment for correcting motion artifacts for brain imaging a motion vector describing translational and rotational motion of a patient's head is tracked during the MRI data acquisition process. The motion artifacts are then corrected based on coherent k-space synthesis using the motion vector data.